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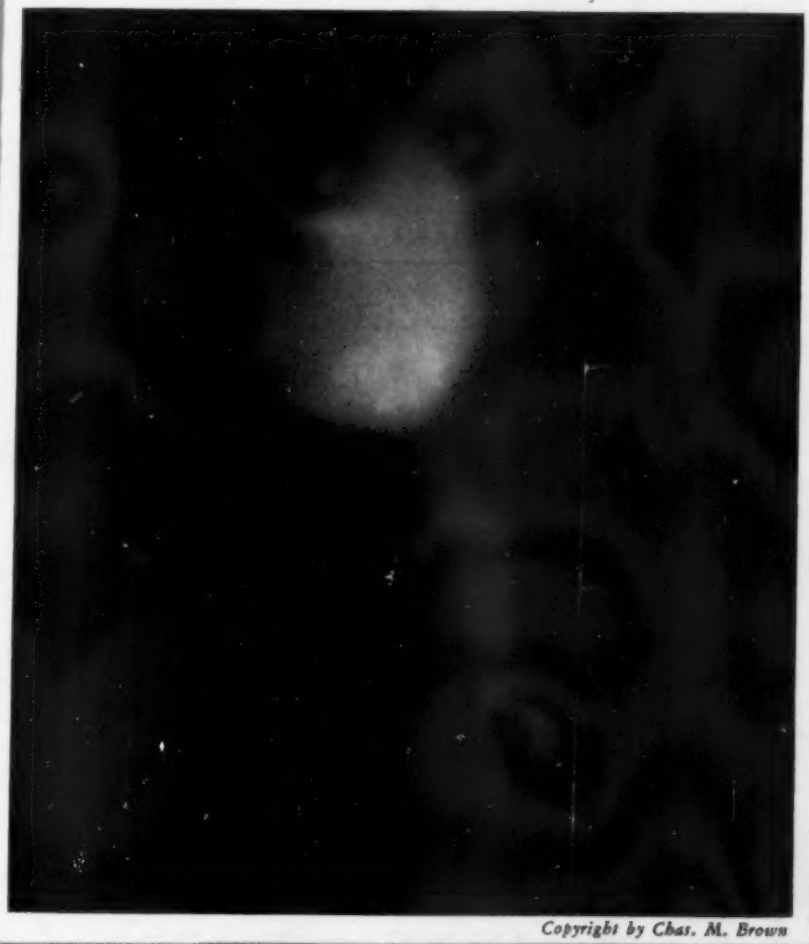
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



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MARCH 24, 1934

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXV *No. 676*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

"Fresh" flowers in blocks of ice were recently shipped from Australia to England.

Tiny larvae of the gypsy moth travel on air currents as high as 2,000 feet above ground.

The Philippine Forest Service is manned by 500 trained workers, all but the director being Filipinos.

Five Indian towns of prehistoric times have been discovered in southern Peru by an archaeological expedition.

The battle formation of a solid phalanx protected by shields was used in Mesopotamia over 2000 years before the Macedonians made it famous.

During one cold wave, the Weather Bureau agricultural forecasts enabled citrus fruit growers in California to save fruit worth $14,000,000.

Disease-bearing mosquitoes are practically unknown in the Florida Everglades.

Two new varieties of almond trees have been developed at the University of California.

Young and rapidly growing cells of the body are more sensitive to radium than old or adult cells.

A meteorite that fell at Hoba in Southwest Africa has an estimated weight of 66 tons.

With a nucleus of 50,000 maps now in its possession, the University of Chicago is planning to develop a great map library for the Middle West.

Some of the Indians in the Cascade and Sierra mountains of California gather the big caterpillars of the Pandora moth and cook them for food.

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These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, prepaid in the United States.

CHEMISTRY—PHYSICS

Triple Weight Element Made As Atoms Yield Energy

Heavy Hydrogen is Both Target and Projectile in Research Suspected of Producing Mass Three of Same Element

EXISTENCE of triple-weight hydrogen, hitherto suspected but unproved, may be demonstrated by a sensational atom-smashing experiment just made by Lord Rutherford, Drs. M. L. Oliphant and P. Hartleck in Cambridge's famous Cavendish Laboratory and announced in *Nature*.

Double-weight hydrogen, now being studied intensively in the world's chemical laboratories following its discovery in America two years ago, was both target and projectile in the new atomic bombardment. Hearts of heavy hydrogen, called deutons in America and diplons in England, were flung with hundred-thousand volt energy at salts of ammonia that contained heavy hydrogen instead of ordinary single-weight hydrogen. This impact of deutons upon deutons (or diplons upon diplons to follow the nomenclature preferred by the British scientists) gave striking results.

3,000,000 Volts

There was enormous emission of fast protons or hydrogen hearts with energies of three million volts. Particles released had thirty times the energy of those used in the atomic attack.

The Cambridge scientists have two ideas about what happened. Either two heavy hydrogen atomic hearts reacted to give a new hydrogen variety of mass three and an ordinary hydrogen atom, or they formed a helium atom of mass three and a neutron.

Important in Either Event

Even if it turns out that mass three helium instead of a triple weight hydrogen is formed, this will prove to be an important discovery. No atoms of mass three have been unequivocally demonstrated in the past although vigorous searches have been made for them. The weight of ordinary helium is four units on the chemical scale on which ordinary oxygen is sixteen.

This discovery of a mass three atomic heart and the enormous volume of atomic transmutations achieved is expected to have important influence upon the present feverish exploration for the secrets of matter's composition.

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CHEMISTRY—PHYSICS

New Element Will Complicate Chemistry

THE DISCOVERY by Lord Rutherford and his co-workers in England of the probable existence of triple-weight hydrogen tremendously complicates chemistry, and yet it would fit in with the ideas of physicists as to how matter is put together.

Before 1931 only one kind of hydrogen was known. Then in America double-weight hydrogen was conclusively demonstrated. This was followed by the production in several American laboratories of heavy hydrogen and the strange heavy water that it forms. The hearts of heavy hydrogen, called deutons in America, become useful projectiles in action smashing. Witness the Cavendish Laboratory experiment that seems to mean the existence of either hydrogen of mass three or helium of mass three.

The existence of mass three hydrogen has been suspected and searches have been made. In fact, last September Prof. Wendell M. Latimer and Dr. Herbert A. Young of the University of California found evidence of its existence in heavy water. They used the magneto-optic method of analysis developed by Prof. Fred Allison of the Alabama Polytechnic Institute, with which Prof. Allison found evidence for the existence of heavy hydrogen of mass two and also discovered the last two unknowns of the 92 chemical elements, alabamine and virginium.

If the existence of mass three hydrogen is conclusively proved, the number of chemical compounds in the universe is prodigiously increased. Take water, for instance. No longer is it simple H_2O. With three kinds of hydrogen and three kinds of oxygen, there can be eighteen kinds of water. When the thousands of compounds containing hydrogen are considered, the complexity becomes bewildering.

There will be controversy over the name of the new hydrogen. Americans will want to call it "tritium" and its heart or nucleus "triton," corresponding to protium and proton for ordinary hydrogen and deuterium and deuton for mass two hydrogen. The British will probably favor "triplogen" and "triplon."

Science News Letter, March 24, 1934

ENGINEERING

Wandering Bridge Scoops Coal From Pit

A GIANT wandering bridge more than a quarter of a mile long has been put in operation digging brown coal from open pit mines in northern Germany. This ponderous steel structure extends its 1312-foot length from the edge of the pit well out over the vast hole from which coal has been obtained for years. Excavators which are a part of the bridge scoop up the coal and load it into conveyors that lead to waiting railway cars.

Eighty-one electric mo- (*Turn page*)

COAL MINER

This unique structure is a coal mining bridge or excavator which is capable of filling 1000 railroad cars a day with brown coal from open pits of northern Germany.

tors move the clumsy structure to new "diggings." It travels at a speed of thirty-six feet per minute over two temporary railway tracks 450 feet apart under the middle of the bridge. Thus it wanders day and night through the open pit scooping up 58,000 cubic yards of coal in 24 hours, enough to fill 1,000 cars.

The huge machine is under the direction of a "commander" who has a stand as imposing as the bridge of an ocean liner, and from it he keeps in touch with all parts of the structure by telephone and remote control devices. Electricity for the operation of the bridge is supplied from a trolley at a potential of 5,000 volts.

Science News Letter, March 24, 1934

RADIO-METEOROLOGY

New Research Links Radio Layer With Weather

WILL the radio become an aid to the weather forecaster in making his prediction of the following day's sunshine or rain?

New evidence linking the ionization density of the radio reflecting layer of the upper atmosphere, and hence the intensity of radio signals with the weather on the ground, has been reported to *Nature* by Dr. D. F. Martyn, of the University of Sydney, Australia.

When night measurement of radio signals reveals that the layer which reflects radio waves of broadcasting frequency has a greater density of electrified particles than it had the preceding night, then the barometer invariably rises within 12 to 36 hours, Dr. Martyn found in experiments conducted under the auspices of the Australian Radio Research Board. In most cases the time lag is nearer 12 hours.

These results agree with those obtained by American scientists, Drs. R. C. Colwell and I. O. Myers at West Virginia University, measuring the signals from Station KDKA. The Americans interpreted them differently, however, concluding that this correlation between radio signal strength and barometric pressure indicates that the lower reflecting layer, which turns back waves of broadcasting frequency, is located in the region affected by changes of barometric pressure, while the short waves are turned back at heights not affected.

The experiments of Dr. Martyn strongly suggest the presence of winds in the high levels of the stratosphere, he said.

Science News Letter, March 24, 1934

ASTRONOMY

Used to Shooting From Hip, Plainsman Snaps Meteorite

See Front Cover

IN THE NOVEL, "Cranford," (does anybody read that delightful old-fashioned tale any more?) a returned cousin from India, as mendacious as he is rich, tells of hunting on a Himalayan alp so high that when he fired at what he took to be a huge bird he found to his astonishment that he had "shot a seraphim." A feat quite as astonishing was really accomplished by a New Mexico rancher, Charles M. Brown, in obtaining the photograph reproduced on the cover of this issue of SCIENCE NEWS LETTER.

This, the first general publication of Mr. Brown's snapshot of a great meteoritic fireball, is in a way the commemoration of an anniversary, for it was just one year ago, on March 24, 1933, that the great flaming invader from outer space flared its way across the skies of the Southwest, visible to thousands of people in seven states.

Many photographs were taken of the persisting trail of the great meteorite after it had passed, but Mr. Brown's is believed to be the only one of its head —and indeed probably the only photograph that ever caught the head of any meteorite in its flight. To get such a picture requires a combination of quickness, skill and luck that would suffice to catch a snapshot of a cannonball. Probably nobody but a plainsman, born of a generation that survived the wild and woolly days largely through its ability to "shoot from the hip" could have taken the photograph.

Mr. Brown did not consider his feat unique at the time, nor even particularly extraordinary. The thing that interested him was the uniqueness of the meteorite, and that was why he wanted—and got—a picture of it.

He told his story to H. H. Nininger, secretary of the Society for Research on Meteorites. He had just sat down to a very early breakfast, a little before dawn on that memorable March morning, when the whole heavens suddenly lighted up. As suddenly, the thought "Meteor!" flashed into his mind. With Mr. Brown, action is almost as quick as thought. He snatched his camera off the top of the radio cabinet, was out of the house in a couple of jumps, clear of the ranch buildings in about three more, pointed his camera and "fired." When the film was developed he found he had scored a clean hit.

When he told his story to Mr. Nininger, the latter could hardly believe that anyone could be quick enough to catch a snapshot of a meteorite in flight. He asked his host to repeat his actions, as nearly as he could, while he timed him. The rancher went through the performance from chair at breakfast table to snapshot "stance" in the open, in about eight seconds.

Finding actual pieces of the meteorite has proved to be a much longer task than getting its portrait. It was not until a couple of weeks ago that Mr. Nininger began receiving them, together with fragments of another, less spectacular meteorite that fell in the same region on August 8, 1933. Two of the fragments of the March 24 meteorite were found near its course of flight, as mapped by Mr. Nininger from data obtained last spring; they were 35 miles short of the end of its visible flight, and another fragment was found twelve miles farther along. Ranchers of the region are still searching for more pieces.

The fragments recovered from both meteorites are of stone, with no iron in them. Mr. Nininger states that they constitute an uncommon variety of aerolite.

Science News Letter, March 24, 1934

▼RADIO▲

NERVES AND ALCOHOL

an address by

Dr. Carl C. Speidel

Professor of Anatomy, Medical School, University of Virginia

Wednesday, March 28, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

WHISTLING GODDESS
She was never wrong; at least, that is what the Africans thought.

ARCHAEOLOGY

Goddess of Fertility Now Rests in Museum Case

FROM the Belgian Congo, the powerful African goddess pictured here has journeyed to an exhibit case in the University of Pennsylvania Museum.

Odima, "the Black One," is made of wood, but wears a high polish from many offerings of palm oil applied by devoted attendants "to refresh the spirit."

In the heart of Africa, Odima was a goddess of fertility. A native woman wishing for a child would consult the medicine man who was the custodian of the goddess. After a conference with Odima, replies apparently issued from the goddess' pursed lips, in a series of whistling sounds. The medicine man interpreted the oracle, telling the anxious woman what Odima said and advised. If the outcome of the situation was unsatisfactory, then, obviously, the woman was unfaithful. The whistling goddess was never wrong.

SOCIOLOGY

Unlimited Births Among Poor Creating Problem For Future

Surveying Revealing Facts of New Study, Dr. Pearl Sees Poverty and Unemployment For Coming Generations

THE NATIONAL policy of prohibiting the free dissemination of accurate scientific information about birth control methods is adding definitely and measurably to the difficulty of the problem of poverty and unemployment with which our children and grandchildren will have to deal.

Dr. Raymond Pearl, biology professor in the Johns Hopkins University School of Hygiene and Public Health, has come to this conclusion as a result of an extensive investigation on birth control practices among American women and their effect upon the birth rate and other population problems. Conducted under Dr. Pearl's direction with financial aid from the Milbank Memorial Fund, a progress report has just been made by Dr. Pearl.

Among the nearly 5,000 women interviewed, it was found that birth control had been attempted regularly or intermittently by 45 per cent. of the white women and 26 per cent. of the Negroes, taken as whole groups. But among the well-to-do and rich white women over 78 per cent. had practiced birth control, while only 33 per cent. of the very poor white women had practiced it.

No Formal Instruction

Almost none of the women, white or colored, had ever had any formal, accurate or scientific instruction in birth control. Many expressed a keen desire for such instruction but did not know where to get it or were hampered in attaining that end by legal and religious restrictions. Slightly over half, 51 per cent., of the white women in moderate economic circumstances practiced birth control.

Birth control was less extensively practiced among newly-weds than among those of longer experience of married life. But among the well-to-do and rich white women recently married 76 per cent. were using birth control, while among the corresponding group of very poor only 19 per cent. used it.

The 4,945 married women included in the investigation lived in 13 different states and 85 per cent. were whites and 15 per cent. Negroes. They were all residents of large cities, and were a fair sample of urban dwellers as regards religion, occupation, wealth and education. Fifty-nine per cent. of the whites and 66 per cent. of the Negroes had never received more than elementary schooling. Thirty-two per cent. of the whites and 27 per cent. of the Negroes attended high school, while only 6 per cent. of the whites and 3 per cent. of the Negroes went to college or university. The white women studied had been married 5.7 years, and the Negro women 6.4 years, on the average.

Babies When Wanted

By the intelligent use of birth-control methods 48 per cent. of the well-to-do and rich white women had produced only planned and wanted babies, exactly when they wished to have them. But among the very poor whites this percentage fell to 13, and for the very poor Negro women to 2 per cent.

"The investigation indicates that the innate natural fertility of married couples is probably substantially similar in all economic classes, and in the white and colored races," Dr. Pearl declares. "The apparent differential fertility observed between social and economic classes, and between the races, appears on the basis of the more refined and accurate computations of this investigation to be due almost wholly to those artificial alterations of natural innate biological fertility which are collectively called birth control, at least in the sample of American women so far studied."

Rich and Poor

By the intelligent practice of birth control among the well-to-do and rich whites the average birth rate was lowered some 73 per cent. below its natural level under present day conditions of life. But among the very poor and poor classes of whites, who numerically make up no small proportion of the whole population, all the really intelli-

gent birth control practiced succeeded in lowering the average birth rate below the natural biological level by only 57 per cent. The investigators reported that only a few more than one-tenth of the women in these unfortunate classes in this sample of material practiced birth control really intelligently.

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PALEONTOLOGY

Glands May Have Caused Evolution of Freak Dinosaurs

DINOSAURS may have evolved some of their most bizarre species as the result of a peculiar glandular disease known as acromegaly. Acromegalic human beings become "horse-faced" giants, with huge hands and feet. The disease is caused by the over-activity of the pituitary, a small gland within the skull.

Acromegaly has been invoked by Dr. Richard S. Lull, paleontologist of Yale University, to account for the terrific skull sizes and the outrageous development of horns by certain species of ceratopsians, or horned dinosaurs, whose remains have been found in the Belly River valley, in western Canada. What may have turned a disease into a driving force in evolution is uncertain: Dr. Lull conjectures some abnormality in the food available to the animals.

One of the ceratopsians, the three-horned, rhinoceros-like *Triceratops,* is fairly familiar to the public, through skeletons and restorations in many museums, and especially through "living" models shown at the Century of Progress exposition last summer and in such motion picture romances as "The Lost World." But there were others of even weirder aspect than *Triceratops;* one of them, known as *Styracosaurus,* not only had a long nose horn, but developed eight still longer horns at the edge of his enormous bony frill or mantle that reached backwards from his head to cover his shoulders.

Although these horned dinosaurs were formidable fighters they were not flesh-eaters. This is indicated by their flat, grinding tooth-surface. Their teeth were renewable, apparently indefinitely, so that their life-span was not limited by dental failure as it is in most mammals, Dr. Lull states.

The apparent acromegalic development of the Belly River dinosaurs was not confined to the horned species, but included, for a time at least, all the great reptiles that lived in that limited area.

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A GIANT EVEN AMONG GIANTS

This skull, one of the largest pieces of dinosaurian headwork known, is in the Peabody Museum of Yale University. The great extension back of the huge horns is the bony collar or frill that covered the great beast's thick neck and shoulders. On the wall is the skeleton of a contemporary flying reptile.

ASTRONOMY

Planetary Merry-Go-Round Will Explain Earth's Motion

A MERRY-GO-ROUND will be an important feature of the new Hayden Planetarium which will open in New York next year in connection with the American Museum of Natural History. But this merry-go-round will not be in competition with those at Coney Island, nor will its passengers ride on painted lions and horses.

Follow Earth's Course

The visitor will be carried in a small carriage in a circle, representing the orbit of the earth, around the sun, an illuminated globe at the center. Above him the earth itself and other planets, in model form, will move around on tracks, and he will be able to see their changing aspects. He will see how, at different times of year, the sun is viewed against a different background of stars, themselves represented by electric lights on the circular wall of the room, 75 feet in diameter. Thus he may be able to form some appreciation of what travellers in rocket ships of the future will see when they leave our solar system and look back upon it from a point a billion miles or so from its plane.

This device, known as a Copernican Planetarium, will supplement the Zeiss optical planetarium on the floor above, in which the starry skies, as they appear from any part of the earth at any time, will be reproduced by the projection of spots of light upon a hemispherical dome. The Copernican planetarium is named after the Polish astronomer who in 1543 called attention anew to the old theory that the earth revolves around the sun. Since then it has been universally recognized by astronomers as a true statement of the facts. Only one other such device is now in existence, at the Deutsches Museum, in Munich, Germany.

Twenty Planetaria

It was at this museum also that the first optical planetarium was erected in 1924. Since then 20 have been erected, including two in the United States, in Chicago, and in Philadelphia. The third is nearing completion in Los Angeles, and the optical planetarium in the Hayden Planetarium will be the fourth in America.

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ARCHAEOLOGY

Ball Courts Give Long-Sought Ancient Monte Alban Date

By Tracing Evolution of Ball Game, Archaeologists Find That Mountain-Top City Was Occupied 1000 Years Ago

WILL AMERICA'S football stadiums and baseball diamonds become important aids to understanding our civilization a thousand years or so from now?

This comes to mind with the news that archaeologists in Mexico have placed the age of a seemingly ageless city by taking note of its ball games.

The city is the famous Monte Alban, today a maze of buried ruins perched on a mountain ridge. Monte Alban gained its widest modern fame when Mexican archaeologists entered a tomb there and found a group of dignitaries buried in shining golden regalia.

But to the archaeologists, whose first question about a place is "How old is it?" Monte Alban remained a mystery. The treasure tomb discovery added to the enigma, for it was "foreign" cache belonging to another culture deposited there for some reason not yet discovered. Dated tombs are being found in Monte Alban. But archaeologists can not yet read Zapotec Indian hieroglyphs, as they can Aztec and Mayan ones. Excavations of three seasons seemed to throw the dead city further and further back in time without a definite clue as to when it was a living metropolis. Now there is a clue. This is a tlachtli, or ball court.

Tlachtli was a widespread Indian game played apparently for both sport and religion. Frans Blom, archaeologist of Tulane University, has found ball courts in Mayan cities dating from early centuries of the Christian era in Chiapas and Guatemala. The game changed somewhat in the course of ten or fifteen centuries, to judge by the courts in Northern Yucatan known to date from a few centuries before the discovery of America.

All courts have an H-shaped space to play in. Very old ones of the south had several round altars in the center, and the side walls enclosing the field sloped. Northern courts lost their altars as centuries went by, their side walls became vertical, and big stone rings were placed in them for the ball to go through. The Monte Alban court seems to fall between these types, as its walls still slope and are without a stone ring, although it had already lost all but one of its central altars. It is therefore likely that Monte Alban was occupied a thousand years ago.

When it ceased to be inhabited or when it began to be is not known, although Dr. Alfonso Caso, chief of the Mexican government archaeologists excavating there, believes Monte Alban may be contemporaneous with early Mayan cities of Chiapas in southern Mexico and Guatemala, and probably inspired by them.

Mayan culture in that region was full-fledged at the time of Christ. It had a complicated calendar, astronomical science, and mathematics, at that stage, for the evolution of which Dr. Caso believes that at least another thousand years had been necessary. Dr. Caso is inclined to think that the brilliant Mayas, during their long period of growth as well as at their height, inspired all the other cultures about them, far and near. He believes that the Monte Alban ball courts are evidence of the northern spread of this civilization, for the Maya land lies to the south and east of Monte Alban.

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EDUCATION

Geology, Economics, Politics Covered by School Train

A UNIQUE educational train tour in Canada, during which geology, economics, and politics students from Princeton University and perhaps other American colleges will study problems common to Canada and to the United States will be made this August.

The trip has been arranged jointly by the Princeton Summer School of Geology and Natural Resources and the School of Public and International Affairs. In past years the department of geology has organized annually summer transcontinental trips through the United States and Canada for purposes of scientific investigation at first hand. This year students of politics and economics will join the excursion, because "geology is closely bound up with the general problems of economics and politics."

Prof. Richard M. Field of the department of geology of Princeton University and director of the summer geology expeditions of recent years, will be in charge of the party. Assisting him will be Dr. Leslie T. Fournier of the Princeton Department of Economics, a native of Canada, who has made a special study of rail and water transportation in the United States, and Dr. Erling Dorff of the Princeton department of geology.

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PUBLIC HEALTH

Nine Die in Pittsburgh From Parrot Fever

NINE deaths from parrot fever and twenty-five cases of the disease have caused the U. S. Public Health Service to send Dr. L. F. Badger of the U. S. National Institute of Health to Pittsburgh to investigate the outbreak there. Dr. Badger has been sent at the request of Pittsburgh health authorities.

The outbreak, said to be one of the most severe that has occurred in some time, originated in a Pittsburgh department store which sold birds. One of the birds from the store was sent to the federal health authorities in Washington and on examination was found to have suffered from parrot fever or psittacosis.

A severe outbreak of parrot fever in many parts of the country occurred in 1930. In order to fight the disease, which was till then little known, the importation into this country of love birds and parrots, which transmit it, was forbidden temporarily. The disease subsequently affected birds in aviaries in southern California and a number of cases were reported from that source. The disease has now become rather a commonplace instead of being a novelty, and outbreaks of two or three cases are reported to the U. S. Public Health Service every few months. The outbreak in Pittsburgh seems to be much more severe.

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Seeds from some leguminous plants are so closely uniform that they are used as standards of weight in the Orient.

SEISMOLOGY

Brine Fountains Spout After Utah Earthquake

FOUNTAINS of brine and mud volcanoes were numbered among more than one hundred new springs that broke from the floor of the desolate and uninhabited Hansel Valley at the north end of Great Salt Lake, when the recent earthquake tore the desert rocks and soil with mile-long rents.

Three great faults were formed in the Hansel Valley floor. Their length ranged from a fourth of a mile to over a mile, with a vertical displacement of "throw" varying from six to fifteen inches. One of the fissures is six inches wide and sinks into the earth to an unknown depth.

Occasioned by the fracturing and settling of the valley floor, more than one hundred new springs appeared. Most of them flowed for only a few hours. Some of the new springs, however, are still producing salt water.

Scores of mud volcanoes also resulted, with cones ranging from one to ten feet in diameter. The great Locomotive Springs temporarily disappeared, only to continue flowing half an hour later, with increased volume.

The earthquakes were occasioned by movements on one of the most easterly of the basin-range faults. If the earthquake had originated in a populous locality, its results would undoubtedly have been disastrous.

Science News Letter, March 24, 1934

ANTHROPOLOGY

Museum Party to Study Peoples Never Recorded

OFF TO the Near East to measure and photograph strange tribes who have never submitted to the camera or the anthropologist's calipers, Henry Field, assistant curator of physical anthropology at Field Museum of Natural History, Chicago, is now en route to Europe.

This expedition will begin its work at Baghdad where Mr. Field will add local workers to the expedition personnel. It is hoped to capture for science about 500 Kurds. Only their photographs and anthropometric measurements will be carried away by the scientists. Then the Rowanduz, a gorge in the mountains that has never before been entered by scientifically trained persons, will be visited. In this wild region there are said to be caves with animal drawings on their walls. And it is said that the animals are those that do not exist now. In this area also may be found natives still clad in mail and chain armor, introduced in the Crusades.

The anthropological exploration will then extend to Teheran, Persia's capital, where groups of natives not yet measured by science will be studied.

The Soviet controlled areas of the Caucausus will be visited. There the Khevsoors, the Svans, and other peoples will be "captured" for science. The party will return by way of Moscow where Mr. Field will study the museums and researches of the Soviet scientists.

Science News Letter, March 24, 1934

PHYSICS

German Atom Expert Heads New Laboratory

PROF. OTTO STERN, expatriate German physicist known for his atom studies, now presides over a laboratory at the Carnegie Institute of Technology established for him through a $25,000 grant from the Buhl Foundation.

Investigations of the structure of the atom by means of the "molecular beam" method developed by Prof. Stern and his collaborators at the Universities of Frankfurt and Hamburg will be continued. Prof. Stern and his assistant, Prof. I. Estermann, have already begun studying deuterium, the heavy weight hydrogen and the heavy water that it forms.

In the molecular beam method of physical experimentation, a gas from the element under study is passed through a fine hole into a chamber where a high vacuum is constantly maintained. Due to the high vacuum, no collisions between the molecules occur and each molecule travels in a straight line. By a series of fine slits the direction of the molecules is controlled and a fine beam is cut out. This is the "molecular beam." By directing the beam through the region of a magnetic field some of the atoms are deflected from the straight course, and a measurement of the deflection has enabled the physicist to calculate the magnetic moment of the atom —the magnetic force required to deflect them from a straight path. By applying these studies and also those they have made in wave properties of matter, Prof. Stern and his collaborators have discovered many facts about the structure of the atom.

Science News Letter, March 24, 1934

IN SCIENC

COSMOLOGY

Abbe Lemaitre Awarded Francqui Foundation Prize

ABBÉ GEORGES LEMAITRE, the Belgian priest-cosmologist, was awarded the annual prize of the Francqui Foundation for his contributions to science which have increased the international prestige of Belgium. The prize is 500,000 Belgian francs (approximately $25,000.)

Abbé Lemaître originated the expanding universe theory. Until February he was an exchange professor at the Catholic University of America and the previous year he visited America as a fellow of the C. R. B. Educational Foundation which was established by the war-time Commission for Relief in Belgium.

Science News Letter, March 24, 1934

ASTRONOMY

Unusual Minor Planet Sighted From Algiers

A NEW heavenly object, probably a peculiar asteroid or minor planet, has come within range of large telescopes, the Harvard College Observatory has been informed by the central astronomical reporting bureau of Copenhagen. The discovery was made by L. Boyer, assistant at the Algiers University Observatory, located at Bouzareah.

Boyer's object, as it is known after its discoverer, is in the constellation of Leo, the lion, nearly overhead in the late evening sky. It is of the twelfth magnitude and too faint to be seen even in small telescopes. It has been sighted from America and has had its position determined by Dr. Fred L. Whipple at Harvard's Oak Ridge Observatory, Prof. L. E. Cunningham at Harvard's Cambridge Observatory, and H. E. Burton at the U. S. Naval Observatory.

The periodic Schwassmann-Wachmann comet increased from magnitude 18 to the still faint, but brighter, magnitude of 13, between March 10 and 14, Yerkes Observatory reported.

Science News Letter, March 24, 1934

NCE FIELDS

ORNITHOLOGY

Unmated Bobwhite Males "Mother" Incubator Chicks

BACHELORHOOD does not make male bobwhite quail morose and socially useless. In fact, it has quite the opposite effect; such lone unmated birds make the best kind of foster-parents for incubator-hatched quail chicks, Herbert L. Stoddard, ornithologist at the Cream Ridge quail preserve in New Jersey, has discovered.

Surplus cock quail were placed in small pens, and each bird was given a brood of about eighteen incubator orphan chicks, just about nightfall when they would most need a parent's care. The steady-going bird bachelors readily adopted their little charges and hovered them during the night.

Within two days each feathered foster-father was allowed to go free into the wild. Later check-ups indicated that their paternal solicitude continued, for all the broods were found to be flourishing. The bachelor "dads" seem to have been good teachers, too, for the young birds they brought up were wood-wise and had all the normal instincts of self-preservation that characterize bred-in-the-wild game birds.

Science News Letter, March 24, 1934

CHEMISTRY—PHYSICS

Lithium Metal Twins Separated for First Time

TWIN varieties of lithium, the light metal that has been so successfully bombarded in atom smashing transmutations, have been separated, making another step in chemistry's conquest of the isotopes, which are varieties of the same chemical element differing slightly in weight.

The two known isotopes of lithium metal, masses six and seven, were separated in quantities of about one microgram (a thousandth of a milligram) by Dr. M. L. Oliphant and co-workers of Cambridge, England. In a communication to *Nature*, Dr. Oliphant describes how the two kinds of lithium were separated by passing ionized lithium gas through electric and magnetic fields, the difference in weight allowing the separation. The two kinds of isotopes were collected on metal discs cooled at a very low temperature with liquid nitrogen.

Since the lithium metal isotopes have atomic weights of six and seven, respectively, the one of mass seven weighs one-sixth more than the other. The purity of the separated samples was indicated by their behavior when bombarded with charged hydrogen atoms of both the single and double weight variety. When so bombarded the two lithiums disintegrate, giving alpha particles (helium atom hearts) of different penetrating power.

The obtaining of heavy hydrogen by electrolysis of ordinary water is the most successful separation of isotopes so far accomplished. The mass of heavy hydrogen or deuterium is two, or twice that of ordinary hydrogen. The ratio of weights facilitates the production of relatively large quantities of these hydrogen isotopes of great purity.

Science News Letter, March 24, 1934

ZOOLOGY

Eighteen Minutes of Sunlight Kills Rattler

SUNLIGHT alone can kill a snake. One of the rattlesnake specimens now on exhibition in the Yosemite National Park Museum was "given the heat" by members of the Yosemite Field School through direct exposure to the sun for 17½ minutes.

When members of the school discovered the snake and wanted it for the museum, decision was made to commit it to death by sunlight. As reported by Ann Hunt, one of the party:

"After 13 minutes of exposure to the sunlight under the watchful eyes of the party it rolled over once or twice, then righting itself it remained writhing somewhat for a few seconds before repeating the action. This it did four or five times. In 17½ minutes it was apparently dead, and remained belly upward, stretched full length. Then a reflex action in the head and about two inches of the body was observed, the mouth opening wide and showing the fangs and trachea very clearly. During this post mortem action the fangs were relaxed, whereas they had been shown in rigid fighting position before. The body after 18 minutes of exposure to the sunlight felt very warm to the touch."

Science News Letter, March 24, 1934

PLANT PHYSIOLOGY

X-Ray Effects Measured By Slowing of Growth in Plants

X-RAY EFFECTS on the living cell can be measured by testing them on the tips of growing seedlings of oats and other plants, and determining to what extent they render inactive the "growth substance" which they produce. The possibility of developing such a biological technique for X-ray measurement is suggested in *Science* by Folke Skoog, research worker at the California Institute of Technology.

Mr. Skoog's work was based on the discovery, first made prominent by Prof. F. A. F. C. Went, a leading Dutch plant physiologist, that if the tip of an oat seedling be cut off and placed in a little block of agar, a kind of plant gelatine, something that causes plants to grow faster oozes out of the tip and into the gelatine. If the agar block be then placed on another decapitated seedling, this mysterious "growth substance" passes into it and causes it to grow faster.

Mr. Skoog's discovery is that if these blocks, "loaded" with growth substance, are exposed to the action of X-rays and are then put on the decapitated seedlings in the usual way, the growth-promoting action is lost, wholly or in part. Something that the X-rays do to the growth substance destroys its power.

X-rayed seedlings show a decrease in growth rate, Mr. Skoog states. But if a block of agar that has not been X-rayed is immediately placed on their cut ends, they retain their power of growth. This appears to be an indication that the growth substance is destroyed in the living plant as well as in the experimental agar blocks.

Although the X-ray dosages used in the experiments were small, none was found so small as to have no effect.

A side-issue to the experiments is the observation, recorded by many previous workers, that mild doses of X-rays greatly increase the tendency of plants to form buds and branches. Mr. Skoog states that growth substance has an opposite effect, suppressing their formation. It would seem possible, therefore, that the apparent stimulation of bud formation by X-rays is in reality a negative effect, being due to the destruction of the bud-suppressing power of the growth substance, rather than to a direct promotion of bud formation.

Science News Letter, March 24, 1934

PSYCHOLOGY

Curious Memory

Remembering Largely Matter of Reconstruction, British Psychologist Concludes After Research From a New Angle

By MARJORIE VAN DE WATER

"I'LL NEVER forget the time when—" and Uncle George is off on another of his reminiscences. And all his nephews and nieces and most of the neighbors that happen to be in the audience wonder why in the great wide world Uncle George should have remembered that particular incident—why he can't forget it after all these years. Especially does it seem curious when you think that Uncle George is the most forgetful person around—never knows where he left his glasses, or whether he fed the cat, and sometimes has been known to walk all the way back home from the store before he could recall what he went there for.

Memory is one of the most curious actions of that mysterious mechanism, the human mind. Psychologists have evolved many theories in attempts to account for it. They have studied it in various ways.

Now a British psychologist, Dr. F. C. Bartlett, of Cambridge University, England, has gone at the matter from a new angle. He has experimented not with ability to memorize poems, or nonsense syllables, or other material for purely rote memory. The material he used for the most part is the sort that you try to remember every day—the gist of a story you have heard, for example. And he has used a test like the old parlor game of "gossip" to see how whole groups forget some things and modify what they remember. You may try his tests yourself on your friends at your next party, with interesting and fun-provoking results.

All Kinds of Reasons

All sorts of things enter into the complex question of what you will remember and what you will forget. Your personal interests are important, your emotional attitude, your past experiences, and the meaning the situation has for you. But even beyond yourself, your memory is determined by the social group to which you belong.

For example, if your name is Kelly or O'Brien, you will probably find it much easier to rememebr how to spell O'Shaughnessy, with all its vowels and consonants, than Schajowicz or Koninklijke, even though they are shorter. Yet if you lived as one of another social group, it might be O'Brien that would be easily forgotten.

It is not difficult for the young man in America to remember which baseball teams played in the last World's Series, or the name of the present heavyweight champion. But if you have among your acquaintances an English youth, you will probably find that these matters very easily "slip his mind."

Remember Cattle Only

Dr. Bartlett found striking examples of this social influence on memory among the Swazi people. They are reported in his book on "Remembering," published by Macmillan.

The Swazis are a South African people widely reputed to have exceptionally wonderful word-perfect memory. Dr. Bartlett decided to verify this by scientific experiment. Various tests of memory given to the people failed until he asked a herdsman for a list of the cattle bought by his employer during the year previously, together with details of the sales.

The herdsman, who could not read or write, squatted unconcerned on the ground and rattled off the complete details of all his master's deals with names and prices. Checking showed that he was correct in nearly every detail.

The Swazis are a group remote and isolated from contact with other peoples, especially Europeans. Their interests are narrow, and most of their culture centers around the possession and care of cattle. Cattle is the big consideration of all the people there.

The Swazi herdsman has an extraordinary ability to remember details regarding cattle. In other matters his memory is no better than yours. This exceptional ability is due to the social pressure of the group.

If you think over your own chief interests and those of your particular group, profession, community, or "gang," you may discover the parallel to the Swazi's cattle in your own set of facts that you have special facility for remembering.

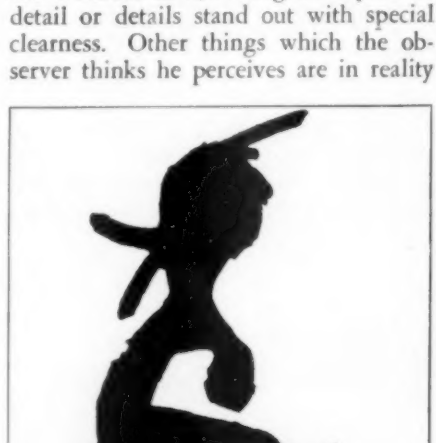
Dr. Bartlett's experiments help to reveal these.

He began with tests of perceiving, for after all, what is remembered of a scene or an event depends primarily upon what was "taken in" by the observer.

Beginning with very simple forms and leading up to complex scenes, Dr. Bartlett showed pictures to his subjects for a very short time and then asked them to reproduce or describe what they had seen.

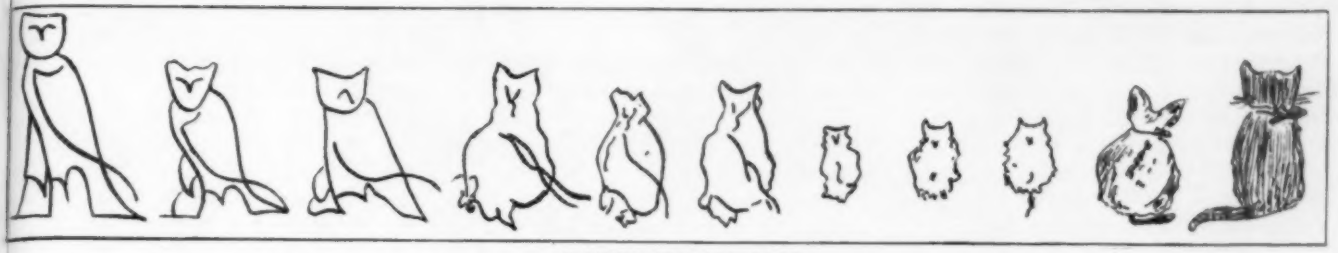
The time of viewing the picture was not long enough for study. The subject just had time for the brief glimpse that in everyday life you might have of an accident just as it is happening—not longer than a quarter of a second.

In that time the subject always gets a general impression of the scene or form before him, and generally some detail or details stand out with special clearness. Other things which the observer thinks he perceives are in reality



WHAT DO YOU SEE?

Ordinary ink blots became valuable tests of imagination, which is akin to memory.



RAPID EVOLUTION

The original sketch on the left represents an ancient Egyptian "Mulak" or conventionalized owl from which our letter M may have originated. Each reproduction was "remembered" from the one next at the left. The tenth was a commonplace cat.

built up—manufactured in his mind—from that initial impression.

One of the cards used by Dr. Bartlett brings this out clearly. It shows a plain geometric design somewhat suggesting the shape of an airplane. Below this design is the inscription "An Airoplaxe." Farther below and to the right is the outline of a hand pointing upward toward the "airoplaxe."

Correct Name Important

All but two of the persons tested said definitely that they saw an airplane, and all but one read the inscription as "aeroplane," the accepted spelling of the word in England where the test was given. One man saw the hand as an upraised cannon pointing at the aeroplane.

The details that you build up on your first general impression may depend upon the name you fasten to that impression. Some of Dr. Bartlett's subjects called one rather ambiguous form an anchor. These persons thought they saw long points on one and a ring in the other, although these details were not actually a part of the form. Others called the same form a turf-cutter and "saw" a smooth round blade. Only one man saw the blade correctly. He had named it a prehistoric battle-axe.

Imagination was tested in the next series of experiments for imagination and memory are closely related; both are the conjuring up of material out of the individual's past and applying it to the present situation.

As a test, Dr. Bartlett used something already utilized by psychologists to gain insight into personality and interests. It is something that you have available on your desk, in case you wish to perform some experiments yourself along this line. For what he used was merely a set of ink blots.

Drop a splotch of ink and watch the resulting fanciful shape, what does it look like? You may see almost anything in it. You will be amused at what your fancy will associate with these odd shapes. And the chances are you will see something entirely different from what anyone else in the world would see.

Dr. Bartlett laid a number of such blots before his subjects with the following instructions: "Here are a number of ink-blots. They represent nothing in particular, but might recall almost anything. See what you can make of them, as you sometimes find shapes for clouds, or see faces in a fire."

Dr. Bartlett was struck first with the enormous variety of the responses. The following diverse answers all originated from the same blot—believe it or not.

Irate lady talking to a man in an armchair; and a crutch.

Bear's head, and a hen looking at her reflection in the water.

Angry beadle ejecting an intruding beaver which has left footmarks on the floor.

A man kicking a football.

Lakes and green patches of meadow-land.

Scarecrow behind a young tree.

Tiny partridges newly hatched.

Animal pictures and the Crown Prince of Germany.

Smoke going up.

Why You Saw It

The interpretation is influenced by personal interests and attitudes, and also by the interests of those of the social group. Those seeing feathers, and bits of finery, and embroidery designs are for the most part women. One man, whom a blot reminded of "Nebuchadnezzer's fiery furnace," was a minister of religion. That same blot reminded a physiologist of "an exposure of the basal lumbar region of the digestive system as far back as the vertebral column up to the floating ribs."

So what you are reminded of, as well as what you "see" or perceive, depend on your personality, and upon your group.

What about remembering?

Dr. Bartlett's first test is another that you can easily try out for yourself. Take a group of five or six pictures of men's faces—a few clipped from this morning's paper will do very well. Let your friend look at them, one after the other following about ten seconds to each one. Then a half hour later ask him to describe them.

You will probably find that he can't do it accurately. He will clearly remember some striking details, such as a mustache or peculiar glasses. But like as not he will place them on the wrong man. But you may notice another peculiar tendency. If one of the men is in uniform or otherwise shows his type, your friend will very likely describe, not the face he has seen in the picture but the face he has learned to associate with that type.

One of the pictures Dr. Bartlett used was of a British soldier—a "Tommy Atkins." The observers described a heavy set man in a trench hat and with coat collar turned up—all details completely lacking from the photograph they had seen.

He had his subjects read short tales somewhat like the old Aesop's Fables, but these were taken from the Folk tales of the American Indians and other primitive peoples. He asked them to repeat them, first after about 15 minutes and then again and again after long and longer intervals.

In long-distance remembering of tales, two things seem to persist. First the general setting, the atmosphere, or the reader's attitude toward the story and second, one or two isolated striking details. All the rest of memory is re-construction from those two starting points.

All the unfamiliar proper names were lost or became modified so as to sound more usual, and other details were similarly conventionalized. Canoes became boats, arrows became "arms" and supernatural or other bothersome details were modified so as to be understandable.

The next experiment was in remembering of a different type of material. The association of a word sign with the

word it represented—somewhat the problem faced by the stenographer when she learns shortland. Dr. Bartlett used the interesting word signs of the American Indians. When his subjects had memorized the signs, he gave some dictation. They were to write words until they came to one for which they knew a sign when they would use the sign.

Personality Enters In

Here again personality entered in. For signs were remembered that fitted into the subject's previous experience—that seemed to him to have significance. You might remember the sign for time, if you happen to know it resembles a certain type of primitive sun-dial. The sign for eye was easily remembered because it is a fairly good representation of a human eye. The sign for word was most frequently forgotten because it was merely a wavy line. Flash was remembered because it resembled lightning, but later recalled as the sign for the word lightning.

Signs are remembered also when they please the individual or amuse him.

They are forgotten when he says to himself, "I will make a special effort to remember this sign."

But the final experiment was the most interesting, for it shows how stories become distorted in the telling, or rather how they become fitted to the previously conceived ideas of the narrators—how history of the same events takes on such various forms in various nations.

An original folk tale was read by the first subject. But the second man, instead of seeing the original, saw the first man's version. In other words, it was just like that favorite old game of gossip, except that the intention was not deliberately to add to the tale but to reproduce it as nearly as possible as it was read.

Although the stories gain some extraneous details, they lose much more than they gain. An exciting story of an air-raid became in the thirteenth reproduction as follows:

"I took the Bothams off the platform and put them into a carriage with the old ladies and some toys. I drove them to the station and put them in the train. The engine whistled four times. I strolled down the platform and turned in disgust."

Reduced to Nonsense

This last subject in the series naturally could make nothing out of the story but sheer nonsense. The "Bothams," which originally were a family the narrator was seeing off on the train just as the station became the center of a raid, had become some unknown and inanimate objects. For three reproductions only the story remained one of an air-raid, and in the fourth it might be suspected as that, although there was no mention of war.

Similarly striking changes occurred in the reproduction of a drawing from one person's version to the next. An ancient Egyptian "mulak" or conventionalized reproduction of an owl lost its characteristic elements in a few versions and soon became a very ordinary looking drawing not however of an owl at all but of a cat. After that following versions added details of curled tail, whiskers, ribbon, and pointed ears. Similarly a peculiar distorted futuristic sort of drawing of a face immediately in the first production assumed more correct proportions. Within very few reproductions it was a perfectly normal, conventional face.

Thus do we constantly modify all that we see and hear to fit in with the previous experience and traditions of our race.

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GEOPHYSICS

Scientists Probe Deep Into Earth For Variety of Secrets

IT IS BECOMING more and more difficult for the earth to keep its secrets, even if they are buried far underground. Inquisitive miniature earthquakes, magnetism and electricity controlled by geophysicists at the surface are rapidly revealing the structure of the earth and the location of valuable mineral deposits hundreds and even thousands of feet below.

Within recent months more than a hundred groups of scientists scattered over the world have been making underground surveys for oil alone, it is revealed by Sherwin F. Kelly in a report to *Mining and Metallurgy*. Most of them are using the seismic method, setting up their own little earthquakes with high explosives and carefully studying the earth waves radiated by the shocks. Some are working with the torsion balance or pendulum instruments which measure minute differences in gravity. Others examine the effect of the earth on magnetism and electricity.

The electrical and magnetic methods are used to make the earth surveys to depths of 2500 feet, beyond which seismic apparatus is employed.

The site for the huge dam to be built at Grand Coulee on the Columbia river was studied, and dam-site surveys in Algeria predicted a faulted condition of bedrock which has been verified by later exploration.

In dry Tunis, a geological formation is being studied so that artesian wells may be drilled in locations most likely to yield water. Magnetic methods were used to locate a needed road building material in Algeria.

Deposits of salt more than 700 feet below the surface in northern New York were studied with a new instrument, the ground comparator, invented by Theodore Zuschlag. This instrument, whose invention is credited by error to his associate, Mr. Kelly, in SNL, Dec. 23, '33, p. 410, is so sensitive that it will follow veins of quartz by making use of their electrical resistance which is greater than that of rock enclosing them. It is now being used for this purpose in an electrical survey in a gold-bearing district near Augusta, Ga.

A valuable new instrument has been developed at the Michigan College of Mining and Technology, Mr. Kelly pointed out, and this college and the Colorado School of Mines are carrying on important research to improve geophysical prospecting methods.

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Full-sized reproductions of Indian homes and ceremonial buildings are to be built on a six-acre plot of ground in New York City, by the Museum of the American Indian, Heye Foundation.

Curiously, radio is helping to build a bridge. Special short wave transmitting and receiving sets make possible communication among groups of contractors scattered on land and water along the eight and one-quarter mile route of the bridge to Oakland, which is under construction. These men on the job also talk with the head offices and with the office of the state engineer in San Francisco.

PHOTOGRAPHY-PHYSICS

Aluminum Mirror Is Superior For Movie Photography

Special Alloy Condensed on Glass Reflects All Colors Alike and With Greater Efficiency Than Ordinary Silver

STRIKING economies in motion-picture illumination are forecast in the use of a new type of metal-front mirror recently developed by Dr. Hiram W. Edwards, physicist in the University of California at Los Angeles. The new reflector, known to camera operators as the "pancro" mirror, is so called because of its panchromatic behavior. It reflects all colors alike. It also reflects light much more completely than the standard silver mirror.

In the manufacture of this mirror a piece of glass, and near it a piece of aluminum alloy are placed together in a large airtight enclosure. Nearly all of the air contained in the vessel is now removed—to be exact, 99.99999 per cent is pumped out. The alloy is then electrically heated to a very high temperature, and readily evaporates into the extremely rarefied air. So few molecules of air are left that the metallic vapors find a rather free and unobstructed path over to the cool glass, where they condense to form a brilliant mirror. Although this process has been used occasionally for many years in preparation of small devices for optical research, its application to commercial illumination problems is new.

The mirror reflects light with approximately 93 per cent. efficiency. The common silver mirror, when operated from the metal side—not as usual through glass—gives approximately the same efficiency with red light, but only 81 per cent, with violet light. Viewed through glass, still lower efficiency is observed. The alloyed metal of the pancro mirror, which is amenable to a special heat treatment, thereby acquires great resistance to deterioration without appreciable loss in power of reflection. It is thus not necessary to put a layer of glass in front for protection. The open surface, unhampered by refraction and absorption, gives properly colored, realistic images not seen hitherto by ordinary mirror gazers. Silver, on the other hand, not only distorts the colors but has a delicate surface which is easily scratched or corroded.

Motion-picture producers, especially those making films in color, require literally terrific quantities of electric energy for illumination. A single scene has taken 45,000 amperes at 110 volts —enough to light a fair sized city. It is not practicable to throw the direct glare of huge lamp batteries directly upon actors' faces, or upon any shiny surface, lest "hot spots," or bright patches, show in the picture. Reflectors are necessary. Unfortunately the low efficiency of silver mirrors with blue and violet light, so valuable in photography, seriously affects the situation.

With the aid of pancro mirror surfaces, direct rays are thrown back, and thence are concentrated upon the photographed objects. Great economy, perhaps as high as 50 per cent. in energy consumption, is expected. Furthermore, the excellent rendering of color values promises usefulness in exhibition as well as production.

Astronomers are greatly interested in a somewhat similar mirror, made of aluminum, which is being independently developed for their uses by experts both in Cornell University and the California Institute of Technology.

Science News Letter, March 24, 1934

GEOGRAPHY

Lofty Mountain Tops Little Higher Than Sea Deeps

MT. EVEREST'S summit is not so far from the middle of the earth as are several other mountain-tops of less pretentious altitude above the sea level. And the bottom of the deepest hole in the ocean, Emden Deep near the Philippines, is very little closer to the earth's core than is the top of Mt. McKinley in Alaska, North America's loftiest mountain.

These and other geographic paradoxes have been worked out by Dr. G. Rösch, German geographer, who reports them in *Die Umschau*.

They are due, of course, to the well-known fact that the earth is not a true sphere but bulges somewhat at the equator and is flattened at the poles. Consequently the nearer you approach either "end" of the earth the nearer also you come to its center. Sea level in high latitude is some thousands of feet nearer the center of the earth than it is at the equator.

Thus it comes to pass that the summit of Everest, in latitude 30 degrees north, has a lower "geocentric altitude" than have the Andean peaks Huascaran, Cotopaxi and Chimborazo and the African mountain, Kilimanjaro, all of them less than ten degrees from the equator. On this same standard, the bottom of the deepest oil well in Texas is "higher" than the top of the Empire State Building, and the bottom of a still deeper borehole in California is "higher" than the Eiffel Tower.

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BIOLOGY

Metals Kill Microbes By Remote Effect

METALS seem to exert a harmful influence upon microbes and seeds even though they are not in contact, it is indicated by experiments reported by G. A. Nadson and C. A. Stern, Soviet scientists, who communicated their researches to the French Academy of Sciences.

They first found that metal plates at a distance of one to two millimeters (1/25 to 1/12 inch) from certain microbes, influenced the microbes. Some kinds of microbes are killed, other kinds are weakened or modified in their characteristics.

Metals of high atomic weight were found to be more effective than metals of low atomic weight. Thus the order of decreasing effectiveness was lead, gold, platinum, aluminum, which is also the order of decreasing atomic weight.

In another investigation, the scientists found a similar effect on plant life. Mustard seeds that had started to germinate were exposed for three days to various metal plates distant one to three millimeters, and their growth was found to be retarded. Again the influence of the metals was in the order of their atomic weights.

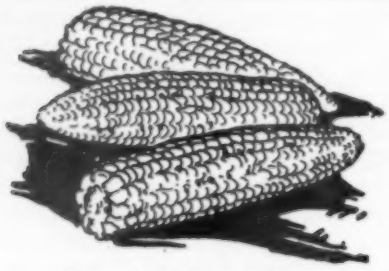
Whether the effect is due to some kind of rays, to a metallic vapor, or to some other cause, the scientists are not yet ready to say.

Science News Letter, March 24, 1934

ECOLOGY

NATURE RAMBLINGS

by Frank Thone



Appetites Permitting

MAN'S ABILITY to eat almost anything has aided in promoting his ability to live almost anywhere.

For it is one of the general facts of nature, that any animal's range is limited, among other things, by the distribution of the kinds of food it can use to advantage. If it can eat only one thing, it will be found only where that one thing occurs; if it can eat a fairly wide range of foods, which however are themselves geographically limited in their range, it will be found within the same geographic limits as they.

A specific example might make each case clearer: The cotton boll weevil can feed only on the immature seed pods of cotton and a few related plants. Hence it is found only in the cotton areas of the world: nobody ever saw a boll weevil in Iowa or Alaska or the middle of the Arabian desert. Coral fishes, on the other hand, can use a number of different kinds of animals for food; but since all those animals live on or near coral reefs the coral fishes are found only in the coral seas.

Animals less "choosy" about their diets range wider: Cattle and horses, for example, can thrive on many different kinds of grass; accordingly we find cattle and horses on all the grasslands of the world, so long as other limiting factors do not intervene to prevent. But they are limited to grasslands: we do not find them in deserts or in deep forests. Honey-making bees can make a living from almost any kind of showy flowers, so we find them wherever such flowers occur.

But man is among the most omnivorous of all animals, and he is thus at home wherever there is anything he can bite off and chew. He seems to do best on the grasslands. Not that he is a grass-eater in quite so primitive a sense as was Nebuchadnezzar; but he does feed very well on the seeds of a few species of giant grasses: corn, wheat rye, rice, barley, millet, even bamboo seeds. The flesh of almost any animal goes into his pot: beef and mutton, fish and fowl, even camel steaks, goat chops, snails, frogs' legs and alligator tail. In China and India, he gets along on an almost wholly vegetarian basis; in the Eskimo fringe of the Arctic he thrives on a hundred-per-cent meat diet. Dates and milk in Araby, coconuts and breadfruit in the South Sea islands, haggis and oatmeal parrich in Scotland, wurst and potatoes in Germany, hamburger-and-onion at any American roadside.

Surely Allah armed man better for world conquest when He put his teeth into his head, than when He taught his hands to make war, and his fingers how to fight!

Science News Letter, March 24, 1934

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CHEMISTRY—PHYSICS

Hydrogen Bombardment Creates Radioactivity

THE NEWEST process for the production of artificial radioactivity is to bombard the light elements, boron and carbon, with hydrogen nuclei.

Dr. C. C. Lauritsen, R. D. Crane and W. W. Harper of the California Institute of Technology, using their giant high voltage tube, have caused the formation of radioactive products by proton bombardment.

A few weeks ago Prof. F. Joliot and Mme. Irene Curie-Joliot produced artificial radioactivity for the first time, and the C. I. T. investigators carried the work further by producing the delayed emission of positrons by flinging deutons, the hearts of heavy hydrogen atoms, at elements.

The products now formed by proton bombardment seem to be the same as those formed when deutons are used instead of protons because their life history is exactly the same. It takes twenty minutes to lose half the activity in the case of the boron product and ten minutes in the case of the radioactivity produced in carbon.

The discoverers believe that the proton breaks up on entering the target atom and forms a neutron and a positron. The neutron escapes immediately but the positive electron is temporarily caught, thus transmuting the boron into carbon and the carbon into nitrogen. They regard this as more plausible than the capture of the whole proton because their energy and momentum equations balance most easily if the neutron escapes. And scientists want to balance their equations as eagerly as a bookkeeper wants to balance his books.

This energy balance will furnish the simplest method so far discovered for weighing the neutron. Preliminary measurements give 1.006 for the neutron mass.

An interesting feature of the Pasadena experiment is the formation of active gases. The gas produced in the boron bombardment comes off quite readily but carbon seems to want to hold on to its product unless heated rather vigorously.

Science News Letter, March 24, 1934

New Hampshire experienced what is believed to be its first reported dustfall, December 15, 1933, the cause being duststorms and also possibly volcanic origin.

OCEANOGRAPHY

New Instrument Devised For Recording Sea Temperature

BORROWING methods used by those who study air conditions in the upper atmosphere, scientists at Massachusetts Institute of Technology have devised an instrument for recording the temperature of the sea down to a depth of 600 feet.

This instrument, built on the same principle as the meteorograph and called the "oceanograph," will be used to study ocean temperatures at various depths for the information which they give of the currents that are so important to ocean "weather."

The currents in the ocean are comparable to the winds in the air above the surface of the water, and they are, in fact, wind-created. The winds blowing over the surface of the sea start the water moving in a number of currents whose movement is superimposed on that of the tides and the great currents such as the Gulf Stream. These lesser currents serve constantly to stir the water to a considerable depth, just as the air is stirred below the base of the stratosphere by the winds.

The oceanograph was developed by Prof. Carl G. Rossby and Dr. Karl O. Lange, of the Massachusetts Institute of Technology, and R. D. Feiber, an expert on instruments. The instrument will be used on board the *Atlantis,* research ship of the Woods Hole Oceanographic Institution.

Science News Letter, March 24, 1934

MYCOLOGY

Battle of Fungi Staged To Check Plant Disease

SETTING a thief to catch a thief is an old adage that has been given a new meaning by Dr. Conrad M. Haenseler of Rutgers University. His experiments suggest the possibility of killing of plant disease fungi by using other fungi, just as entomologists have long fought insect pests by turning loose other insects that are their natural enemies.

Rhyzoctonia and *Pythium,* two genera of plant disease fungi, were used in the experiments. These are extremely destructive in seed beds, causing what is known as "damping off," a disease which kills seedlings by rotting them near the ground line.

The friendly fungus used in the miniature combat within the laboratory was *Trichoderma,* a tiny, thread-like plant growth, microscopic in size, which is commonly found in the soil.

Dr. Haenseler and M. C. Allen, research assistant in soil microbiology at the Experiment Station, inoculated a sterile seed bed with the three species of fungi and then planted cucumbers. In the beds containing the friendly fungus, twice as many seedlings grew and only a slight damping off was discovered, as compared with seed beds inoculated with only *Rhyzoctonia* and *Pythium.*

Several tests were made in the greenhouse with cucumbers and with peas. In the laboratory, tests showed that in a nutrient solution in which *Trichoderma* had recently been grown, *Rhyzoctonia* and *Pythium* could not be made to grow.

Science News Letter, March 24, 1934

•First Glances at New Books

Additional Reviews On Page 192

Ethnology

THE SUPERHUMAN LIFE OF GESAR OF LING—Alexandra David-Neel and the Lama Yongden—*Claude Kendall,* 390 p., $3. The Iliad of Tibet, the national poem of the country, tells the fabulous history of Gesar of Ling. Madame David-Neel has undertaken to put this narrative into English. Most of it she wrote down as a holy man of Tibet narrated it to her, and his version she checked with manuscripts and other sources. Gesar is believed to have been a real person of the seventh or eighth century. In time, songs glorifying him were composed and sung and portions were written, but so numerous are the adventures attributed to the hero king that few bards know all of the story. Tibetans believe Gesar reincarnated will one day sweep all foreigners from the East and then march victoriously on the West.

Science News Letter, March 24, 1934

Physics

L'ÉLECTRON MAGNÉTIQUE—Louis de Broglie—*Herman et Cie, Paris,* 315 p., 100 fr. An important presentation and explanation of the Dirac theory of the electron, which has so greatly interested physicists from several points of view. The author, who is a Nobelist and professor at the Sorbonne, has, of course, himself contributed largely to the new physics. The history of the development of the new physics during the last twenty years as it affects the theory of the electron is given as an introduction to the detailed presentation of the Dirac theory and its consequences.

Science News Letter, March 24, 1934

Medicine

PHOTOCHEMICAL IMMUNIZATION—S. Peskind—*S. P. Mount Print. Co.,* 73 p., $1. This presentation of the author's theory will be of interest only to scientists.

Science News Letter, March 24, 1934

Industry—Psychology

HUMAN RELATIONS IN CHANGING INDUSTRY—Harry Walker Hepner—*Prentice-Hall,* 671 p., $5. The relations between employees and industry can be conducted in a more intelligent manner, a manner which the author designates as "industrial artistry." The author, who is assistant professor of psychology at Syracuse University, formerly in charge of personnel research for several large corporations, reminds us that modern life has become so envolved that each one of us is employer, employe and fellow worker. All of us must make personal adjustments to the changes that periodically sweep society such as business prosperity, business depressions, and the political programs exemplified in the New Deal.

Science News Letter, March 24, 1934

Medicine

ASTHMA, HAY FEVER AND RELATED DISORDERS: A GUIDE FOR PATIENTS—Samuel M. Feinberg—*Lea and Febiger,* 124 p., $1.50. This small volume contains much interesting and useful information on the subject of hay fever, asthma, hives, headaches and other forms of allergic disturbances. It is written in simple, non-technical style for the layman and should prove a helpful supplement to the physician's directions and explanations to the individual patient.

Science News Letter, March 24, 1934

Medicine

I KNOW *JUST* THE THING FOR THAT!—J. F. Montague—*John Day,* 265 p., $2. A physician discusses a number of everyday ailments, tells some of the things causing them and what to do for them. Included are such conditions as constipation, headaches, backaches, dreams, sleeplessness, blood pressure both high and low, halitosis and over- and underweight.

Science News Letter, March 24, 1934

First Glances at New Books

Additional Reviews On Page 191

Physics

LES RAYONS a β γ DES CORPS RADIOACTIFS EN RELATION AVEC LA STRUCTURE NUCLÉAIRE — Madame Pierre Curie—*Hermann et Cie, Paris,* 40 p., 12 fr. No one can write with more authority upon the alpha, beta and gamma rays and their relation to nuclear structure than Madame Curie. She presents concisely and with the minimum of technicality the present status of the exploration of the atom.

Science News Letter, March 24, 1934

Health Education

ALCOHOL: ITS EFFECTS ON MAN—Haven Emerson—*Appleton,* 114 p., $1. Here is an excellent presentation of the scientific facts about alcohol and its effects. The book is written for school teachers who are required to give these facts to their pupils, and for high school and college students, but it will undoubtedly be of interest and value to a much larger group of readers. It is simple, concise, scientific and unbiased. Prof. Emerson was the editor of a valuable scientific symposium on the same subject published in 1932 under the title "Alcohol and Man."

Science News Letter, March 24, 1934

Electricity

MCDONALD'S ELECTRICAL DICTIONARY—George McDonald—*Meador Pub. Co.,* 192 p., $1.50. From A to Z, the words relating to electricity which are in ordinary use as well as new words, terms and abbreviations are defined.

Science News Letter, March 24, 1934

Physics

SPECTRES MOLÉCULAIRES, Étude des Molécules Diatomiques—P. Swings—*Hermann & Cie, Paris,* 51 p., 14 fr.

Science News Letter, March 24, 1934

Mathematics

LES ESPACES DE FINSLER—E. Cartan—*Hermann & Cie, Paris,* 40 p., 12 fr.

Science News Letter, March 24, 1934

Ethnology

THE DISTRIBUTION OF ABORIGINAL TRIBES AND LANGUAGES IN NORTHWESTERN MEXICO—Carl Sauer—*Univ. of California Press,* 94 p., free. From his familiarity with the country of Northwestern Mexico and his researches, Prof. Sauer has found reason to revise current information on the early Indian tribes and languages of that region. With minor exceptions, the authorities he cites have not been previously utilized. A large map shows the distribution of the tribes and the northeastern direction of displacement, that began late in the seventeenth century.

Science News Letter, March 24, 1934

Entomology

BUMBLEBEES AND THEIR WAYS—Otto Emil Plath—*Macmillan,* xvii+201 p., 10 pl., $4. Prof. Plath has made a special study of bumblebees in this country and in Europe, so that he is able to bring to bear on his task the thoroughness of the original researcher as well as a full knowledge of the literature. The information in his book is therefore complete, yet it is presented with due consideration for the eye and vocabulary of the non-technical reader. We have all been brought up on the wonders of the hive bee's community, which is a complex insect city; not less remarkable are the more village-like ways of the smaller communities of the bumblebees.

Science News Letter, March 24, 1934

Education

RURAL ADULT EDUCATION—Benson Y. Landis and John D. Willard—*Macmillan,* 299 p., $1.75. Of America's 122 millions, 53 million are living in the rural sections. These people are removed from the city night high schools and public libraries. The facilities for adult education that are available in the country—the radio, the agricultural extension courses, the farm organizations, and so on, are carefully surveyed in this volume.

Science News Letter, March 24, 1934

Education—Radio

EDUCATION ON THE AIR—Ed. by Josephine H. MacLatchy—*Ohio State Univ.,* 380 p., $3. The fourth yearbook of the Institute for Education by Radio containing the proceedings of the meeting of the institute. Of interest to anyone who has to do with the planning or preparation of radio broadcasts.

Science News Letter, March 24, 1934

Physics

LA MÉTHODE DU CHAMP SELF-CONSISTENT—L. Brillouin—*Hermann & Cie, Paris,* 47 p., 12 fr.

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Ethnology

OUR PRIMITIVE CONTEMPORARIES—George Peter Murdock—*Macmillan,* 614 p., 117 illus., $5. Books on primitive man are apt to describe a few of the prominent features of his life without giving a complete picture of his everyday living. Prof. Murdock's book aims to fill this gap, answering the question: How does the "savage" actually live? He answers by describing 18 tribes, which include the Polar Eskimos, Samoans, Ainus, Iroquois, Dahomeans, Tasmanians. Aztecs and Incas he includes as primitive on the ground that they are studied by the anthropologist rather than by the historian or sociologist. The chapters are closely packed with facts and supplemented by bibliographies.

Science News Letter, March 24, 1934

Psychology

SOCIAL PSYCHOLOGY — Abraham Myerson—*Prentice-Hall,* 640 p., $3.50. The visceral-organic structure of man is basic to the understanding of psychology, and apart from his group a man is a mere potentiality. These are the contentions of the author, who is professor of neurology at Tufts College Medical School and director of research at Boston State Hospital. His viewpoint in the discussion of "visceral social psychology" will be novel to many.

Science News Letter, March 24, 1934

General Science

THE WORLD AROUND US—S. R. Powers, Elsie F. Neuner and H. B. Bruner—*Ginn,* xix+475 p., $1.20. A well planned text in general science for junior high school use. Experiments are arranged so that they can be performed with everyday objects, requiring only a minimum of special laboratory apparatus. Illustrations also carry into the commonplaces of life the significances of science.

Science News Letter, March 24, 1934

Mathematics

QUESTIONS NON RÉSOLUES DE GEOMÉTRIE ALGÉBRIQUE—Lucien Godeaux—*Hermann & Cie, Paris,* 24 p., 8 fr.

Science News Letter, March 24, 1934

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